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Report Title

Overview of the Analysis of Possible Risk to
Threatened and Endangered Species
Associated with Use of Glyphosate-containing Herbicides
in Alfalfa Production

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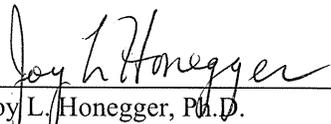
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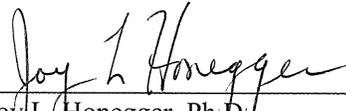
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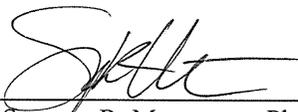
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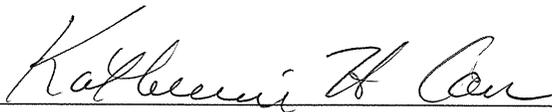
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LIST OF ABBREVIATIONS

a.e.	Acid Equivalent, amount of glyphosate expressed as glyphosate in the acid form rather than the salt form
EEC	Estimated Environmental Concentration
GENEEC2	(GEN)eric (E)stimated (E)nvironmental (C)oncentration Model -EPA Screening level model for determination of aquatic exposure concentrations
EC₅₀	Concentration at which effects on 50% of the test organisms are predicted
FESTF	FIFRA Endangered Species Task Force
IMS	Information Management System
LC₅₀	Concentration that is predicted to be lethal to 50% of the test organisms
LOC	Level of Concern, EPA policy tool to assess acceptability of risk
MJD	Multi-Jurisdictional Database
NOAA	National Oceanic and Atmospheric Administration
NOEC	No Observed Effect Concentration
PLSS	Public Land Survey System
RQ	Risk Quotient = EEC/TE, compared with LOC to assess acceptability of risk at a screening level
TE	Toxicity Endpoint (most sensitive endpoint for a specific taxon)
TerrPlant	Terrestrial Plant Exposure Model used to calculate exposure to terrestrial plants
T-REX	Terrestrial Residue EXposure Model used to calculate exposure and risk to birds and mammals
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service

1. ABSTRACT

This report provides an overview of the multi-step approach utilized to assess the possible risk to threatened and endangered species from the use of glyphosate herbicides in alfalfa production. The detailed steps in the process are presented as separate reports that are described and referenced in this report. This assessment follows the procedures described in the *Overview of the Ecological Risk Assessment Process in the Office of Pesticide Programs, U.S. Environmental Protection Agency, Endangered and Threatened Species Effects Determinations*, published in 2004 (USEPA, 2004), as well as methods utilized in more recent threatened and endangered species effects determinations conducted by the U.S. Environmental Protection Agency (EPA) for new glyphosate uses on bentgrass (USEPA 2006(a)), for atrazine¹ and for the California red-legged frog².

An initial assessment of the risk to all taxa was conducted using the EPA deterministic risk quotient approach (USEPA, 2004). Exposure estimates were based on standard EPA exposure models, and effects endpoints were taken from the EPA assessment for new glyphosate uses on bentgrass (USEPA 2006(a)) or from EPA guideline studies conducted by Monsanto if these endpoints were lower. The conclusion from this assessment, reported in Monsanto Report No. RPN-2007-227 (Mortensen et al., 2008), is that threatened and endangered plant species are not at risk from ground applications of glyphosate of less than 3.5 lb glyphosate acid (a.e.)/ acre or from aerial applications of less than 0.70 lb a.e./acre, however, they may be at risk when rates exceed these values. No other taxa were determined to be at risk from the use of glyphosate herbicides in alfalfa production.

Because threatened and endangered plant species may be at risk from certain uses of glyphosate in alfalfa production, a more detailed evaluation of the locations of threatened and endangered plant species relative to areas of alfalfa production was undertaken. First, the co-occurrence of threatened and endangered plant species and alfalfa production was determined at the county level (Monsanto Study Nos. CS-2005-125 and CS-2007-229). Listing information, species habitat and proximity data at the county-level were evaluated for these identified species to determine which counties require further assessment. In counties with both threatened or endangered plant species and alfalfa production and with no applicable exclusions or protections, the possible exposure of threatened and endangered plant species to glyphosate was assessed at the sub-county level (Carr & Honegger 2008(a) – 2008(g), Monsanto Study Nos. RPN-2007-230 – RPN-2007-236). Finally, sub-county areas have been identified in which threatened and endangered plant species are potentially at risk from exposure to glyphosate under certain application conditions. These areas have been described and mapped so that measures can be implemented to limit glyphosate exposure in these areas. (Carr & Honegger 2008 (h)– 2008 (n), Monsanto Study Nos. RPN-2007-237 – RPN-2007-243).

Exposure limitations are proposed within these defined sub-county areas in locations where the habitat is suitable for the threatened or endangered plant species of interest. In these locations, application rate limitations or buffers between the application area and the suitable habitat or other mitigations are proposed.

¹ U.S. Environmental Protection Agency. (December 19, 2007). Endangered Species Effects Determinations and Consultations. Retrieved January 1, 2008, from <http://www.epa.gov/oppfead1/endanger/litstatus/effects/#atrazine>

² U.S. Environmental Protection Agency. (October 25, 2007). Effects Determinations for the California Red-legged Frog. Retrieved January 1, 2008, from <http://www.epa.gov/espp/litstatus/effects/redleg-frog/index.html>

2. INTRODUCTION

Glyphosate, N-(phosphonomethyl)glycine, CAS Number 1071-83-6 (Figure 1) is a broad-spectrum, non-selective, post-emergence systemic herbicide with activity on essentially all annual and perennial plants.³

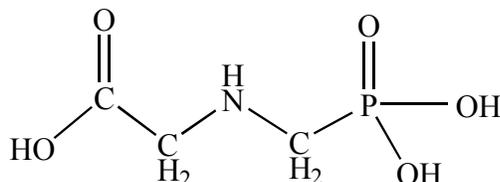


Figure 1. Glyphosate (CAS Number 1071-83-6)

Glyphosate has both a carboxylic acid and a phosphonic acid moiety as well as an amine moiety, all of which are ionized at pH 7. It is typically formulated as a salt containing a cation such as ammonium, potassium, or isopropylamine. Glyphosate, when applied to plant foliage, is translocated to the growing points of the plant, including the meristematic tissue in the roots and shoots. Glyphosate inhibits the enzyme 5-enolpyruvylshikimate-3-phosphate (EPSP) synthase, which is an enzyme in the biosynthetic pathway in plants for aromatic amino acids. This enzyme is found in plants and microorganisms, but not in animals or humans, contributing to the low risk to human health or to animals from the use of glyphosate according to label directions. Glyphosate has favorable environmental characteristics, including strong adsorption to most soils, making it unlikely to move to groundwater or to reach or be absorbed from the soil by nontarget plants. In addition, significant degradation of glyphosate occurs in soil and natural waters (Franz et al., 1997; Giesy et al., 2000).

Glyphosate-containing herbicides (e.g. Roundup® brand agricultural herbicides⁴) are used to control weeds in conventional and glyphosate-tolerant (Roundup Ready®) alfalfa, as well as in many other crops. In conventional crops, glyphosate is applied prior to the emergence of the crop to control weeds. The maximum single application rate for this purpose is 3.75 lb glyphosate acid equivalents (a.e.)/acre, if applied by ground application equipment. The maximum rate using aerial application methods is 1.55 lb a.e./acre, for all crops except sugarcane (for which the maximum single rate applied by air is 2.25 lb a.e./acre). In glyphosate-tolerant crops, applications of glyphosate can occur either before or after crop emergence. Crop stages and rates at which glyphosate can be applied vary by crop. For Roundup Ready alfalfa, rates up to 1.55 lb a.e./acre can be applied using either ground or aerial application methods either before or after crop emergence. For other Roundup Ready crops, application rates can be as high as 3.75 lb a.e./acre prior to crop emergence, but the maximum single in-crop application rate does not exceed 1.55 lb a.e./acre and is lower for a number of crops.

³ A few crop species have been intentionally modified to exhibit tolerance to Roundup, and a few weed species have developed resistance to glyphosate.

⁴ Roundup and Roundup Ready are trademarks of Monsanto Technology LLC.

This report provides an overview of the multi-step approach utilized to assess the possible risk to threatened and endangered species from the use of glyphosate herbicides in alfalfa production. The detailed steps in the process are presented as separate reports that comprise the subsequent volumes of this submission. This assessment follows the procedures described in the *Overview of the Ecological Risk Assessment Process in the Office of Pesticide Programs, U.S. Environmental Protection Agency, Endangered and Threatened Species Effects Determinations* (USEPA, 2004), as well as methods utilized in recent threatened and endangered species effects determinations conducted by the U.S. Environmental Protection Agency (EPA) for new glyphosate uses on bentgrass (USEPA 2006(a)), for atrazine¹ and for the California red-legged frog.²

3. TIER I RISK ASSESSMENT FOR ALL TAXA

An initial assessment of the risk of glyphosate use to all taxa was conducted using the EPA deterministic risk quotient (RQ) approach, with comparison to the established Levels of Concern for endangered species (USEPA, 2004), as summarized in Figure 2. Risk quotients were calculated as the quotient of the Estimated Exposure Concentration (EEC) and the relevant toxicity endpoint for the most sensitive species for a given taxon. For acute studies, an LC₅₀ or EC₅₀ was utilized in the RQ calculation; for chronic studies, the No Observed Effect Concentration (NOEC) was used.

Exposure estimates were based on the standard EPA exposure models (USEPA, 2004). For estimation of aquatic exposure of the active ingredient, GENECC2 was utilized. Default drift values and the EPA standard pond were utilized for estimation of aquatic exposure for formulations. For terrestrial animals, the T-Rex model (USEPA 2006(b)) was utilized to calculate both estimated exposure and risk. For terrestrial and semi-aquatic plants, only the drift component of the TerrPlant model was used to determine exposure rates. Runoff was not considered to contribute to exposure, since glyphosate binds very tightly to soil and does not have soil activity (USEPA 2006(a)). Effects endpoints were taken from the EPA assessment for new glyphosate uses on bentgrass (USEPA 2006(a)) or from EPA guideline studies conducted by Monsanto if these endpoints were lower. Studies from the literature were considered when the study design was appropriate for the assessment being made and sufficient information regarding test substance characterization was available.

The conclusion from this assessment, reported in Monsanto Report No. RPN-2007-227 (Mortensen et al., 2008), is that threatened and endangered plant species are not at risk from ground applications of glyphosate of less than 3.5 lb glyphosate acid (a.e.)/ acre or from aerial applications of less than 0.70 lb a.e./acre, however, they may be at risk when rates exceed these values. Since the maximum single application rate before or after crop emergence in Roundup Ready alfalfa is 1.55 lb a.e./acre, no listed⁵ plant species are predicted to be at risk from ground application of glyphosate to Roundup Ready alfalfa. No other taxa were determined to be at risk from the use of glyphosate herbicides in alfalfa production.

4. REFINED ASSESSMENT FOR THREATENED AND ENDANGERED PLANT SPECIES

Based on the determination that threatened and endangered plant species may be at risk from certain uses of glyphosate in alfalfa production, a more detailed evaluation of the locations of threatened and

⁵ Threatened and endangered species are also at some times in this report referred to as “listed species”.

endangered plant species relative to areas of alfalfa production was undertaken. This process was divided into three phases, as outlined below.

- First, the co-occurrence of threatened and endangered plant species and alfalfa production was determined at the county level (Priester et al., 2007 and 2008, Monsanto Report No.'s CS-2005-125 and CS-2007-229). **(Phase 1)**
- Next, in counties with both threatened or endangered plant species and alfalfa production, the possible exposure of threatened and endangered plant species to glyphosate was assessed at the sub-county level (Carr & Honegger 2008(a)– 2008(g), Monsanto Study Nos. RPN-2007-230 – RPN-2007-236). **(Phase 2)**
- Finally, in sub-county areas where under certain application conditions the potential for threatened and endangered plant species to be at risk from exposure to glyphosate could not be excluded, these areas have been defined so that measures can be implemented to limit glyphosate exposure. (Carr & Honegger 2008(h) – 2008(n), Monsanto Study Nos. RPN-2007-237 – RPN-2007-243). Measures to limit glyphosate exposure in these areas are proposed. **(Phase 3)**

4.1. County-level Assessment (Phase 1)

The county-level assessment (Priester et al., 2007; 2008) compares the U.S. counties which have threatened or endangered plant species with those counties that were reported to have alfalfa farms or harvested acres of alfalfa. The identification of counties with alfalfa production is taken from the 2002 Census of Agriculture (U.S. Department of Agriculture, 2002). The threatened and endangered plant species considered in this assessment are those found in the List of Endangered and Threatened Plants (50 CFR 17.12, U.S. Fish and Wildlife Service (USFWS), 2005(a)).

Information regarding the presence of threatened or endangered plant species within a county was obtained from two sources. The first source was the FIFRA Endangered Species Task Force (FESTF) Information Management System (IMS). The FESTF IMS locations were based on a dataset provided to the FESTF by the U.S. EPA in June 2003. The second source of county-level plant species location data was the FIFRA Endangered Species Task Force MJD (Multi-Jurisdictional Database). The FESTF MJD consists of a “licensed dataset” drawn from NatureServe’s Multi-Jurisdictional Database (MJD) licensed to FESTF. The “licensed dataset” contains information on listed species, including sub-county location data. County-level locations of listed plant species were derived from this dataset. In counties that were found to have both threatened or endangered species and alfalfa production, species were examined with respect to their current listing status, actual crop and species locations, species biology, and species habitat requirements, in order to determine whether or not exposure to glyphosate was of concern.

Some threatened or endangered plant species could be excluded from further consideration based on exclusions or protections that currently exist. Exclusions that have been employed include change in species listing status, extirpation, habitat not in proximity to agriculture, species not in proximity to alfalfa production (California), and species not in proximity to agriculture for other reasons. There are also protections that are already in place that eliminate some species from further consideration. These protections include agreements between a government agency and the landowner to protect the species.⁶

⁶ U.S. EPA County Bulletins were among the protections considered in the county-level assessment.

The procedures used in Phase 1 to identify counties containing threatened or endangered plant species that require further evaluation are depicted as a flow chart in Figure 3. Figure 4 depicts the geographic distribution of alfalfa production in the U.S. at the county level. Figure 5 depicts the counties where both alfalfa production and listed plant species occur prior to consideration of exclusions or protections. Figure 6 displays the counties that were identified to require further analysis at the sub-county level in Phase 2 after exclusions and protections have been considered.

4.2. Sub-county Assessments (Phase 2)

In counties with both threatened or endangered plant species and alfalfa production and where no general exclusions or protections were applicable, the possible exposure of threatened and endangered plant species to glyphosate was assessed at the sub-county level (Carr & Honegger 2008 (a)-(g), Monsanto Report No.'s RPN-2007-230 – RPN-2007-236).⁷ Figure 7 presents a flow chart describing the assessment process used in Phase 2.

For the sub-county analysis, land cover data from the 2001 National Land Cover Dataset (NLCD, 2001) was utilized for the contiguous U.S.⁸; while for Hawaii, land cover data collected in 2000 by NOAA (National Oceanic and Atmospheric Administration) Coastal Services Center was used.⁹ Both datasets have a resolution of 30 meters. For the counties and species requiring further analysis, land cover identified in the 2001 NLCD as being “Pasture/Hay” (Class 81) or “Cultivated Crops” (Class 82) was used for the assessment of proximity to listed plant species (for Hawaii, the “Cultivated Land” classification was used). These classes of land use were considered “relevant land use” for this assessment, since land designated as cultivated crop land could be converted to alfalfa production, and fields in alfalfa production could be converted to cultivated cropland (alfalfa fields would be classified as Pasture/Hay in the 2001 NLCD).

Threatened and endangered plant species location data at a sub-county level were obtained from the FIFRA Endangered Species Task Force MJD (Multi-Jurisdictional Database, October 2006)¹⁰. The FESTF MJD consists of a “licensed dataset” drawn from NatureServe’s Multi-Jurisdictional Database (MJD) licensed to the FESTF.¹¹

⁷ The Phase 2 assessment is presented as a summary report which describes the methodology employed in determining the potential for exposure of threatened and endangered plant species to glyphosate as a result of alfalfa production and six additional reports which present the detailed maps for each listed species observation. The detailed reports are organized by region, with the states being grouped according to the U.S. Fish and Wildlife Service Regions.

⁸ NLCD 2001 data was collected from 1994-1998, and represents the best comprehensive collection of national land use and land cover information for the United States.

⁹ The NOAA data are described as a comprehensive land cover map for the Hawaiian Islands (<http://www.csc.noaa.gov/crs/lca/hawaii.html>).

¹⁰ Information for New Jersey counties was not in the FESTF MJD. The sub-county location data for New Jersey was obtained directly from the state.

¹¹ Under the terms of the FESTF license with NatureServe, the sub-county species location data are confidential information available only to FESTF member companies, companies having satisfied their data compensation obligations, and to the U.S. EPA’s Office of Pesticide Programs. Information based on the sub-county species location data may be shared with cooperating federal and state agencies for regulatory decision-making related to endangered species assessments for Monsanto products. All report pages that describe or depict this sub-county location data are presented in a confidential attachment to the respective report.

Geographic information systems (GIS) software (ArcGIS v 9.2; ESRI Inc.) was used to identify the threatened or endangered species observations that had overlap with relevant land uses. In addition, an assessment was also conducted to identify the species observations that were within 250 feet of relevant land use. This additional distance is sufficient to protect the species from exposure as a result of spray drift from aerial application. This distance was calculated using the AgDrift model (version 2.04) assuming the maximum aerial application rate of 1.55 lb glyphosate a.e./acre, medium-to-coarse spray droplet size, and using the lowest NOEC¹² from the glyphosate vegetative vigor non-target plant study (0.035 lb a.e./acre) conducted by Monsanto (Chetram and Lucash, 1994).

For counties where relevant land use and listed species observations were determined to be within 250 feet of each other, the last observed date of the species observation was examined. Only observations made after 1976¹³ were considered relevant for further analysis. Additional observation-specific data (e.g. field notes) were examined to identify observations that are noted to be “historic” or “extirpated”. In some cases, species with observations later than 1976 were flagged as “extirpated”. Additional protection and exclusion information was received from the state heritage programs that was used to exclude additional observations from further analysis. In situations of historic, extirpated, or not-of-concern observations, no further analysis was conducted. Figure 8 depicts the counties where a relevant land use (cultivated crop or pasture/hay) is within 250 feet (in proximity) of an observation of a threatened or endangered species. The observations in these counties were considered in Phase 3. Also depicted in Figure 8 are those counties for which it was determined in Phase 2 that all species observations were historic, extirpated, or not at risk from agriculture. These observations were not considered in Phase 3.

4.3. Sub-county Assessments (Phase 3)

For the observations of threatened or endangered plant species which were within 250 feet of relevant land uses, the next phase of the analysis was to identify these areas in such a way that they could be designated for the use of mitigation measures for the application of glyphosate (Carr & Honegger 2008(h) – 2008(n), Monsanto Study Nos. RPN-2007-237 – RPN-2007-243).¹⁴ Because the state heritage programs provided the sub-county location information for threatened and endangered plant species to NatureServe, these state programs were contacted to determine whether it was acceptable to the state programs for the sub-county species location information to be available to the public with only an additional 250 feet distance applied as a “resolution distance” around the area where the species was located. In some cases, this distance was acceptable. In other cases, the state programs requested that a larger area be identified to provide additional uncertainty regarding the location of the species.¹⁵ Larger areas were typically requested for plant species that would be of particular interest to collectors.

¹² The units used for this No Observed Effect Concentration are units of application rate (lb a.e./acre).

¹³ The past 30 years is considered a conservative time period for this assessment. In several cases, species observations from the mid-1990s were noted as “extirpated” or “not found” in subsequent field surveys, as reported in the MJD additional fields.

¹⁴ The Phase 3 assessment is presented as a summary report that describes the methodology employed in identification and description of potential areas where use limitation measures may be applied, and six additional reports which present the detailed maps identifying the area of potential use limitations for each listed species observation. The detailed reports present the species observation details, with the states being grouped according to the U.S. Fish and Wildlife Service Regions.

¹⁵ The North Carolina Natural Heritage program provided updated species location data and requested that this data be used to define potential areas for use limitation.

Proximity analysis tools available in the GIS software were used to add the additional uncertainty area requested by the state heritage programs to the species observation area. These buffered observations were then mapped with surrounding surface features, such as roads, creeks, rivers, and railroads.

The description of the areas in which mitigation measures (use limitations) are proposed to be applied varies depending on whether the state in which the area is located uses the Public Land Survey System (PLSS) to describe land areas. In states which utilize PLSS, areas proposed for mitigation measures were described as a portion of a section.¹⁶ In states that do not utilize PLSS for land description, generally the eastern states and Texas, other physical land features (such as roads, rivers, and utility and railroad rights-of-way) were utilized to describe areas where mitigation measures were proposed. Satellite imagery of land areas which was linked to road maps of the same area (e.g. Google™ Maps) was often helpful to confirm the presence of roads, utility rights-of-way and streams or rivers used in the description.

In the Phase 3 reports (Carr & Honegger 2008(h)- 2008(n)), habitat descriptions are provided for each threatened or endangered species. Within the area described for mitigation measures, these measures are only considered necessary when the habitat for the listed species is present.

The mitigation measures proposed for the defined areas are designed to reduce the exposure of the listed plant species to glyphosate in these areas. Other measures may be available or may become available in addition to those proposed in this submission. For ground applications, no mitigations are proposed for Roundup Ready alfalfa and none are proposed for glyphosate application rates up to 3.5 lb a.e./acre in conventional alfalfa or in any other crop. For aerial applications in both Roundup Ready and conventional alfalfa, a separation distance is proposed between the application area and the threatened or endangered plant species habitat based on the application rate and the mean spray droplet size distribution being used. Separation distances are not considered necessary when the wind direction is blowing from the defined species habitat toward the application area, since any spray drift under these conditions will not be in the direction of the species habitat.

Figure 9 describes the process used to define potential areas where mitigation measures (use limitations) may be applied. Figure 10 depicts the counties and areas within those counties where use limitations may be appropriate. In states without PLSS sections, many of the areas proposed for use limitation are too small to be visible at the scale of the national map. For these states, the counties with areas for use limitation are outlined.

¹⁶ A section is described as a square land area that is 1 square mile (640 acres). Due to variations in historical survey methods, section size can vary in some areas (http://nationalatlas.gov/articles/boundaries/a_plss.html).

5. CONCLUSIONS

This report describes an overview of the assessment process used to determine whether threatened or endangered species are at risk from the use of glyphosate as a herbicide in conventional or glyphosate-tolerant alfalfa production. Based on a screening level risk assessment, that followed EPA guidelines and recent assessments, only threatened and endangered plant species were determined to be potentially at risk under certain conditions of use. A multi-step process was then utilized to identify specific areas within counties where threatened or endangered plant species have the potential to be at risk from certain uses of glyphosate-containing herbicides in alfalfa production.

Table 1 summarizes the results of each step in this identification process. The assessment was initiated by considering all counties in the United States in which alfalfa is produced and all U.S. counties which contain threatened or endangered plant species. Exclusions for habitat, protections, proximity assessments, and observation notes were used to identify only areas where the potential for risk is current. To minimize the impacts on agriculture, these areas were defined as precisely as possible, while still protecting the species. Potential measures to limit certain uses of glyphosate in these areas are proposed in the Phase 3 reports.

Table 1. Numbers of listed species observations, counties and species involved in the endangered plant species assessment for use of glyphosate-containing herbicides in alfalfa production at major steps in the assessment

Assessment Category	Number of:			
	States	Counties	Plant Species	Species Observations
Alfalfa Production (2002)	49	2663	--	--
Listed Plant Species ^a	50	1315	729	--
Both Alfalfa Production and Listed Plant Species	48	1015	550	--
Requiring further analysis after consideration of Exclusions and Protections (end of Phase 1)	40	438 ^b	141	--
Proximity of Alfalfa Production and Listed Species (end of Phase 2) ^c	31	281	78	1399
Areas of potential use limitations (Phase 3) ^c	31	284	79	-- ^d

^a Listed plant species include both threatened and endangered plant species.

^b Of the 438 counties identified in Phase 1, 418 counties had sub-county location data in the NatureServe MJD. For 11 New Jersey counties and 2 New Mexico counties, sub-county location data was obtained directly from the state. For 7 counties identified in Phase 1, there was no sub-county location data available. No further analysis was done for these 7 counties.

^c These values exclude species observations that are historic (pre-1977), extirpated, or identified as having no risk from agriculture, and include information based on updated North Carolina location data.

^d Not reported since the proposed use limitation areas may include more than one species observation.

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Figure 2. Tier I Endangered Species Assessment

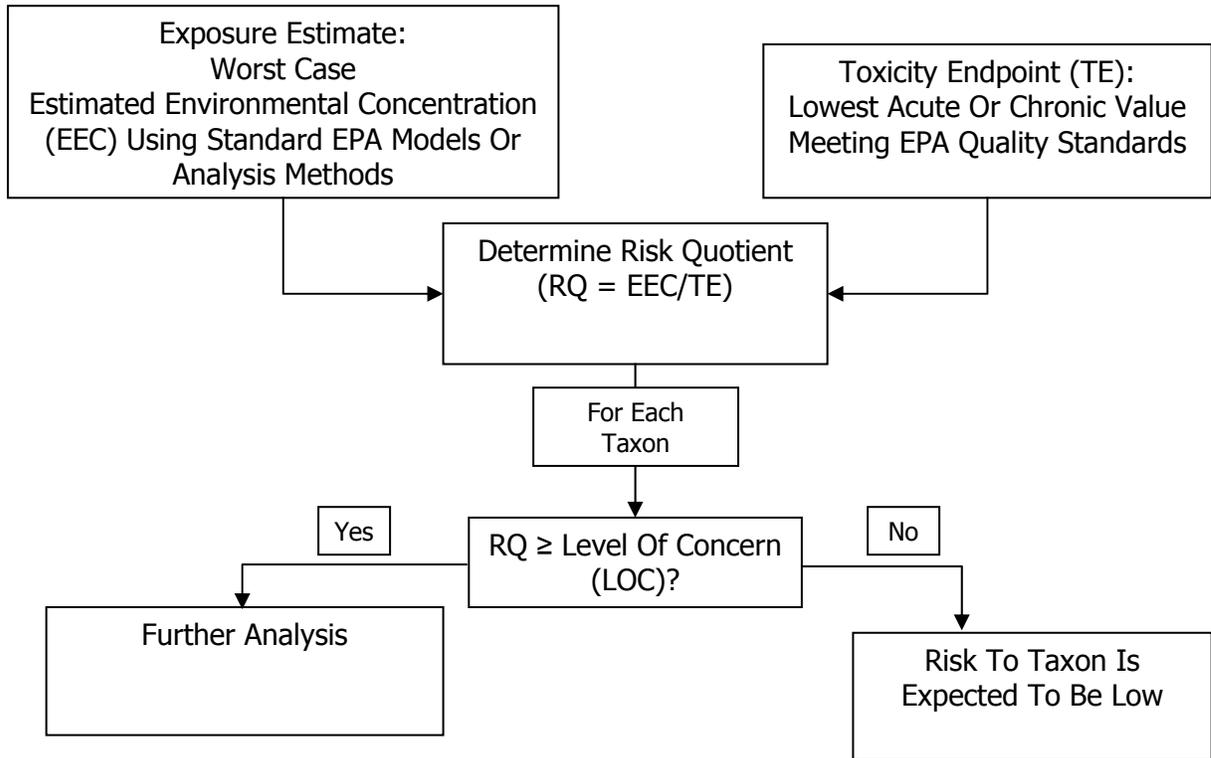


Figure 3. Phase 1: County-Level Assessment

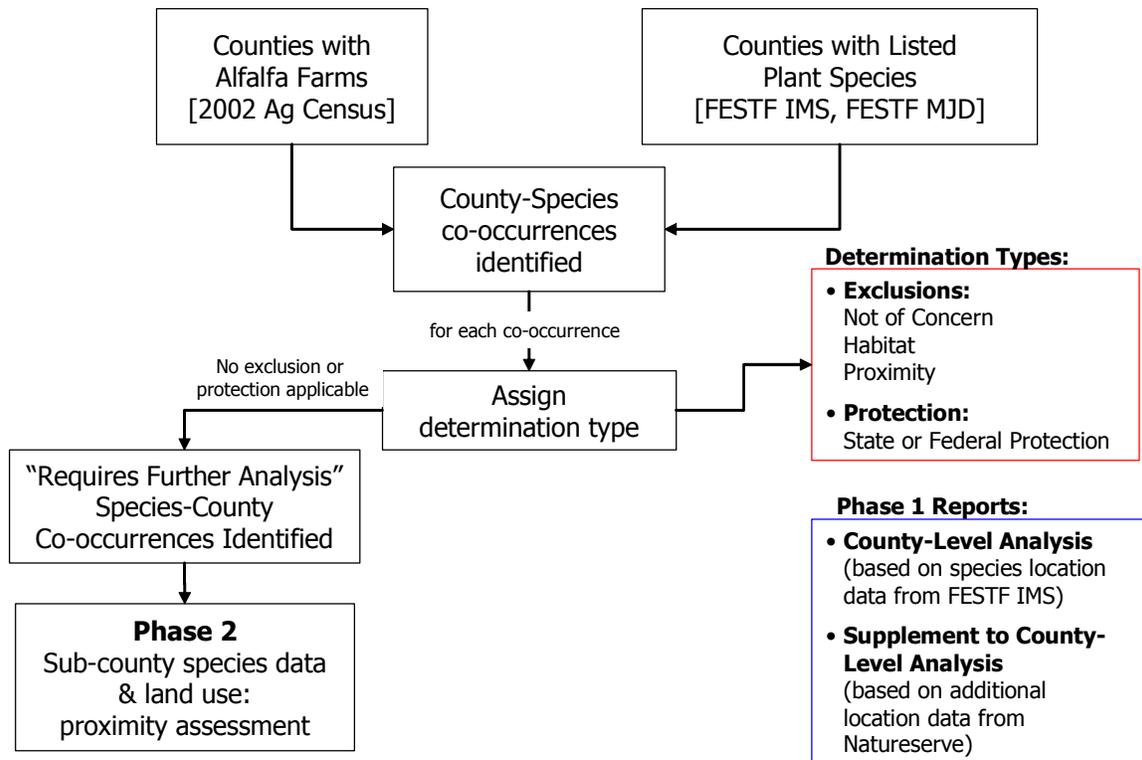


Figure 4. U.S. Counties with Alfalfa Production Based on 2002 Census of Agriculture

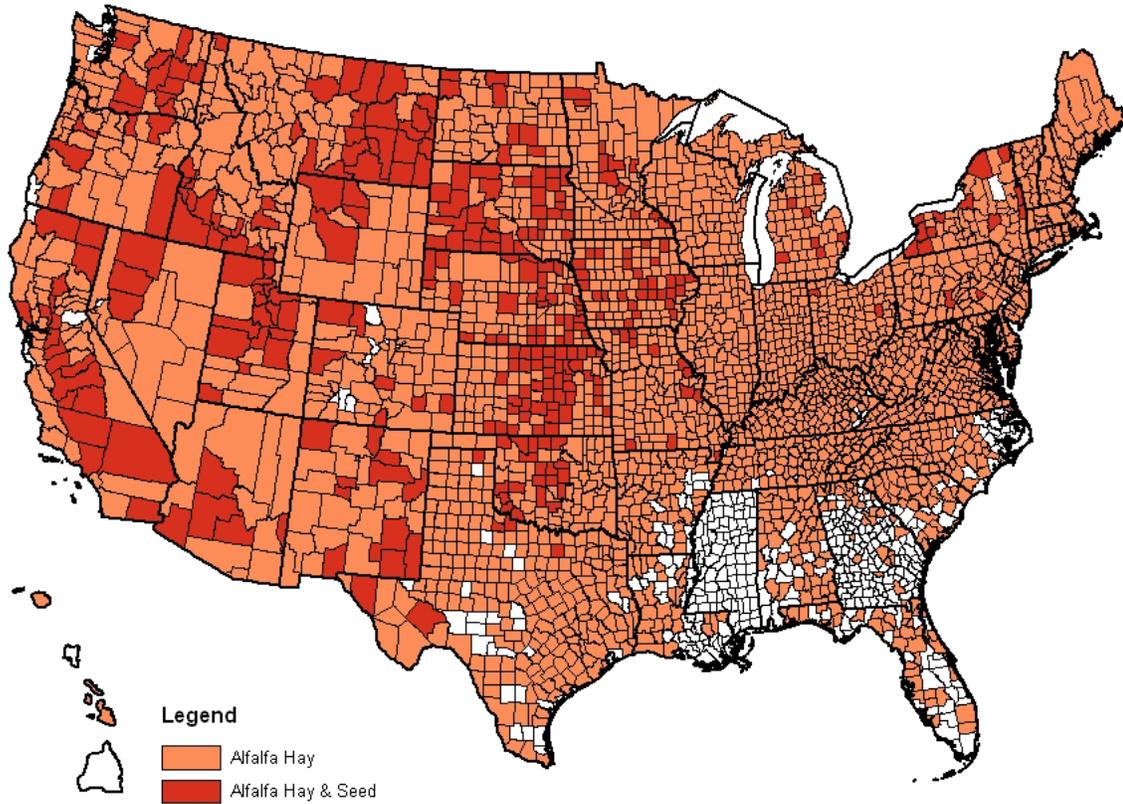


Figure 5. U.S. Counties with Alfalfa Production and Listed Plant Species

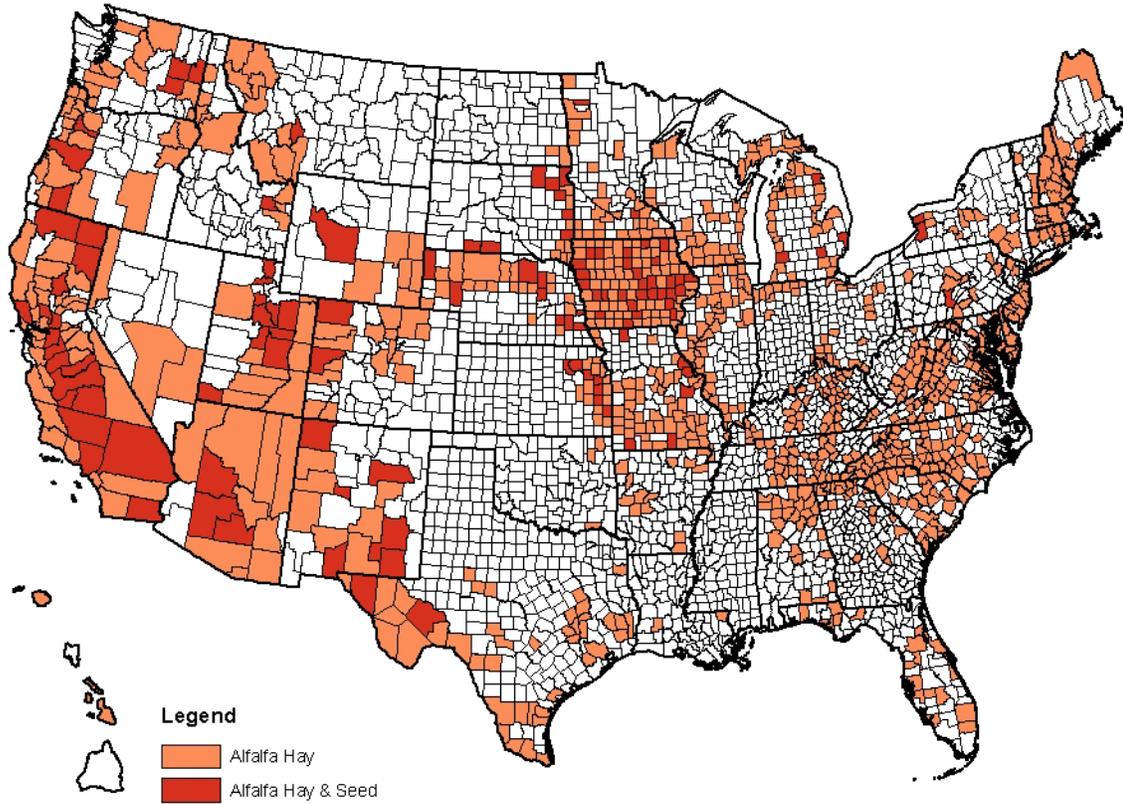


Figure 6. U.S. Counties with Alfalfa Production and Listed Plant Species for which Further Analysis is Required

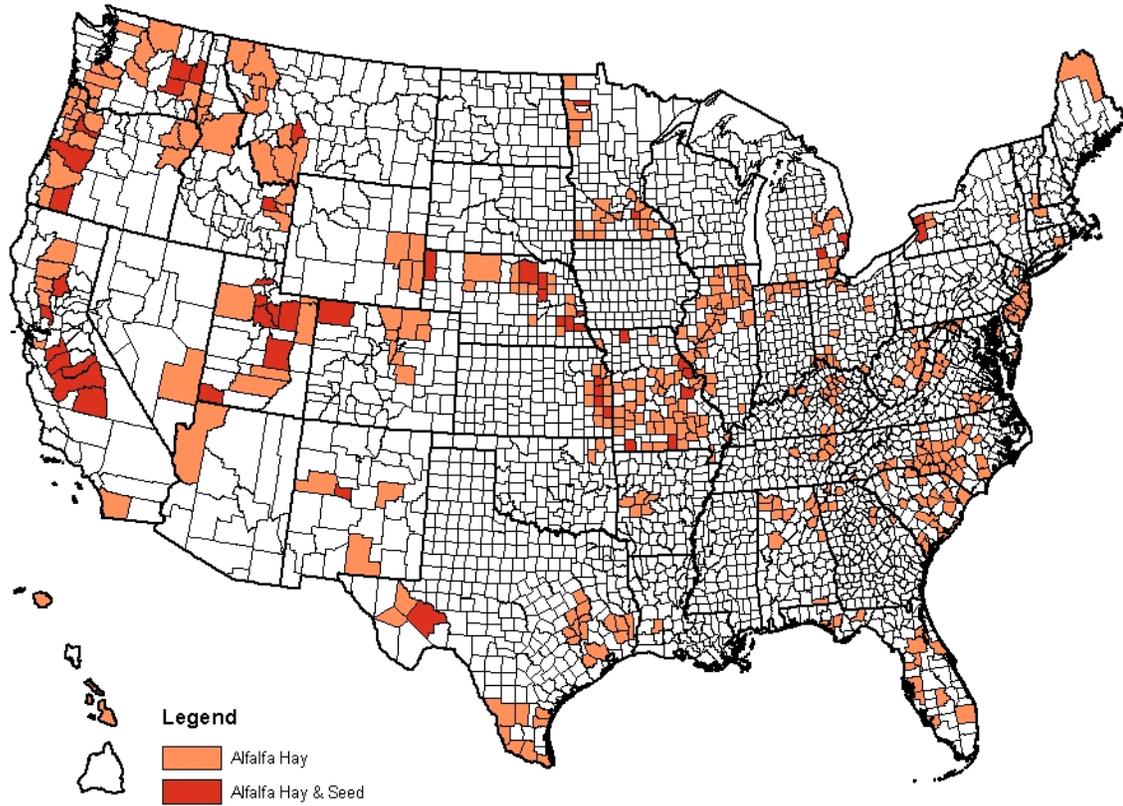


Figure 7. Phase 2: Sub-County Proximity Assessment

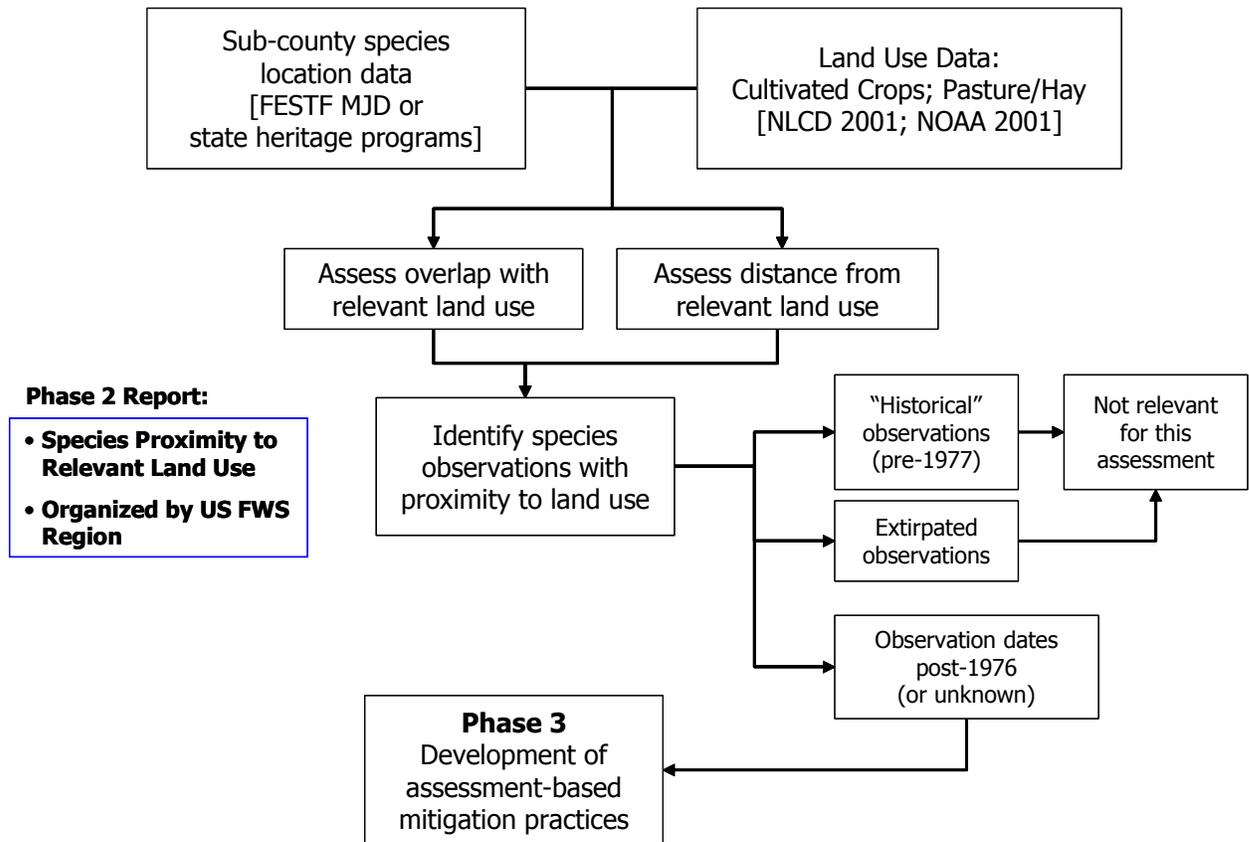


Figure 8. U.S. Counties with Alfalfa Production and Listed Plant Species: Phase 2 Results

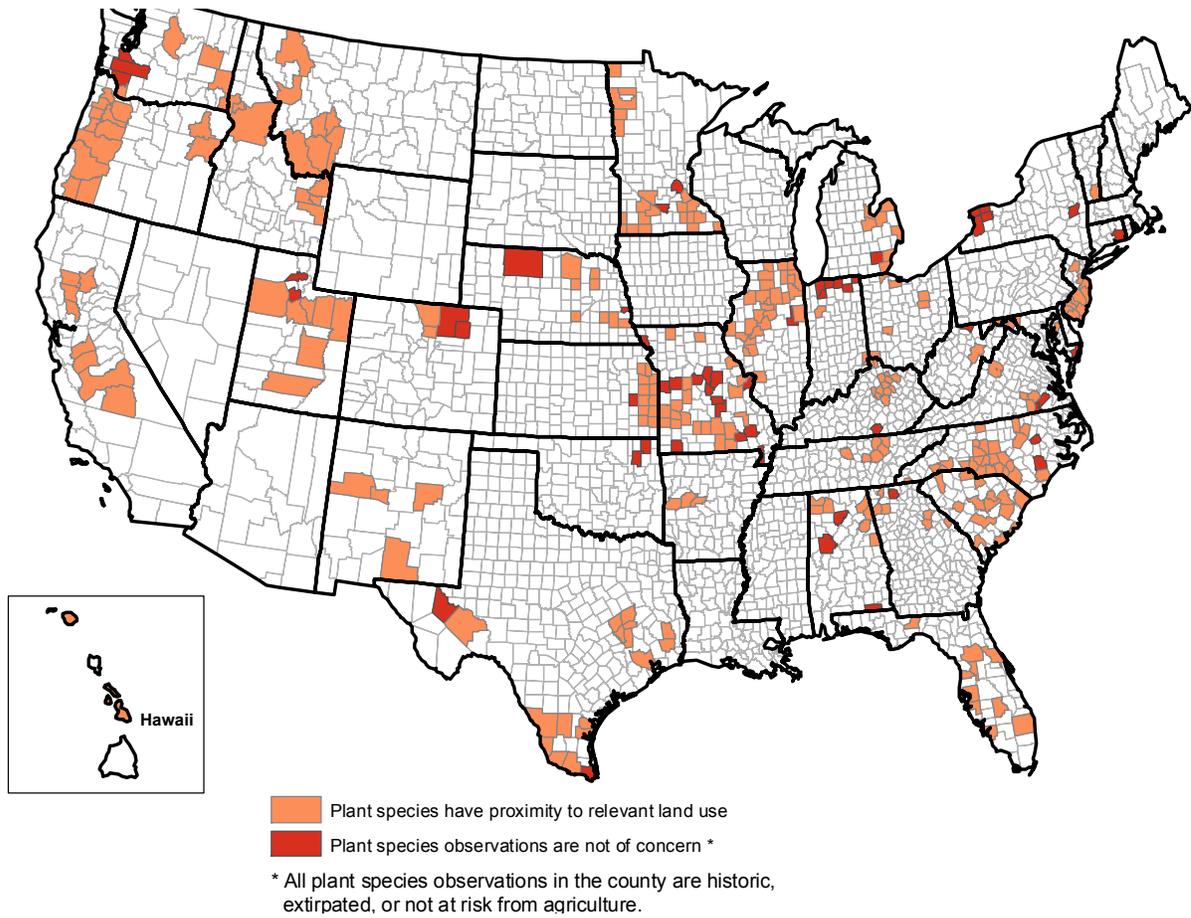
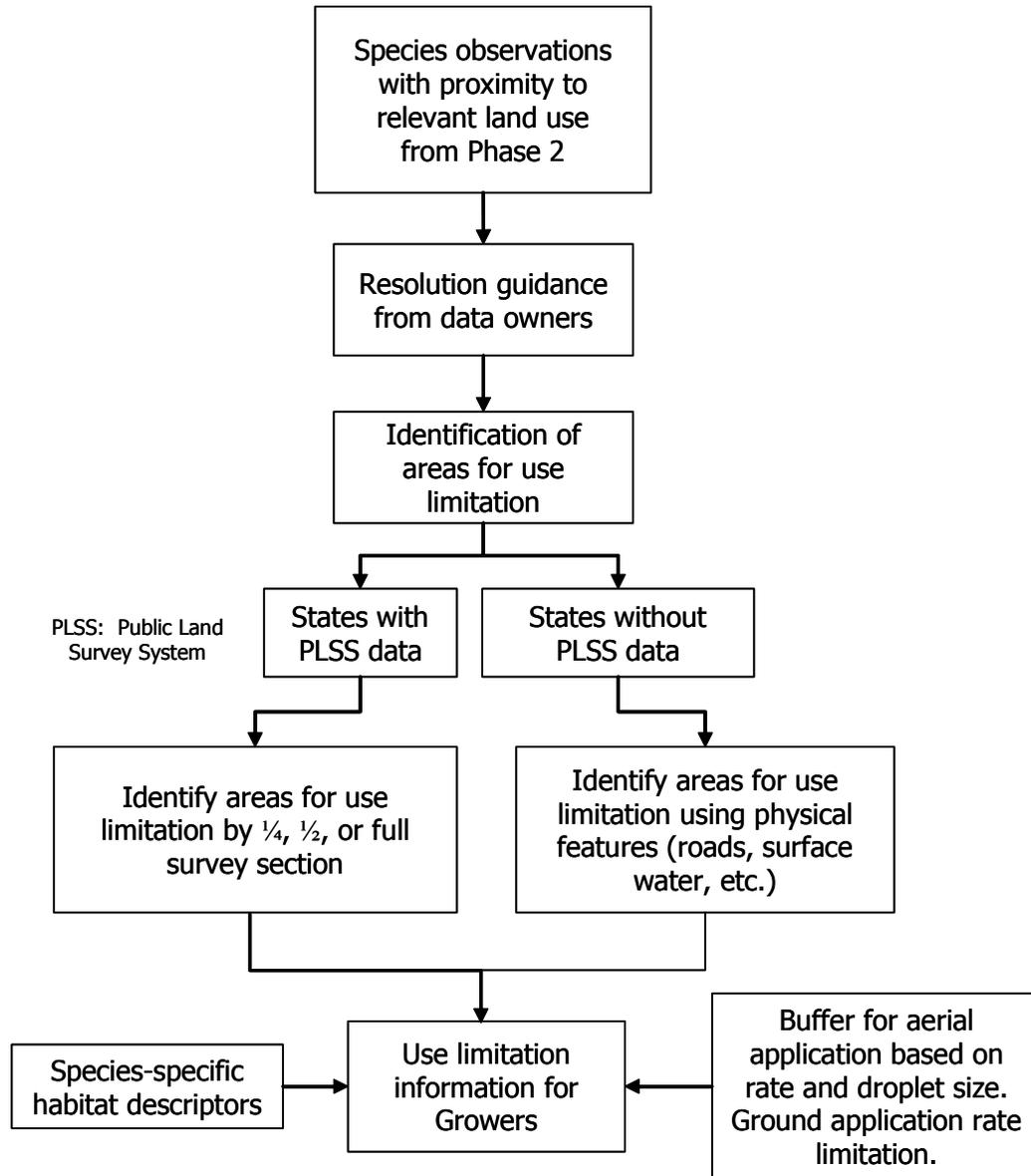


Figure 9. Phase 3: Development of Assessment-Based Mitigation Practices



Phase 3 Report:

- **Development of Assessment-Based Mitigation Practices**
- **Organized by US FWS Region**

Figure 10. Proposed Areas of Potential Glyphosate Use Limitation

